

Appendix A

RF Test Data for 2.4G (Conducted Measurement)

Product Name: WIRELESS FLASH TRIGGER

Trade Mark: NEEWER

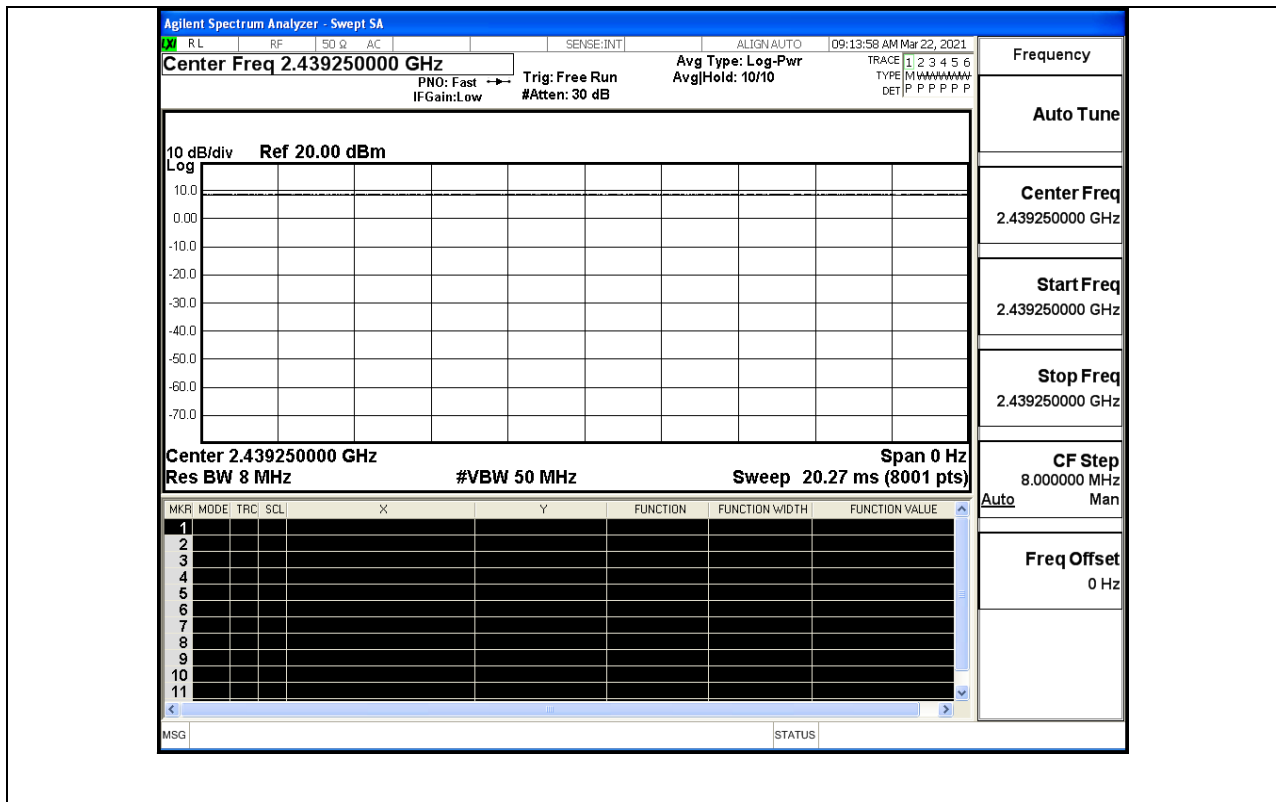
Test Model: Q-C

Environmental Conditions

Temperature:	24.6 ° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Li Huan

A.1 Duty Cycle

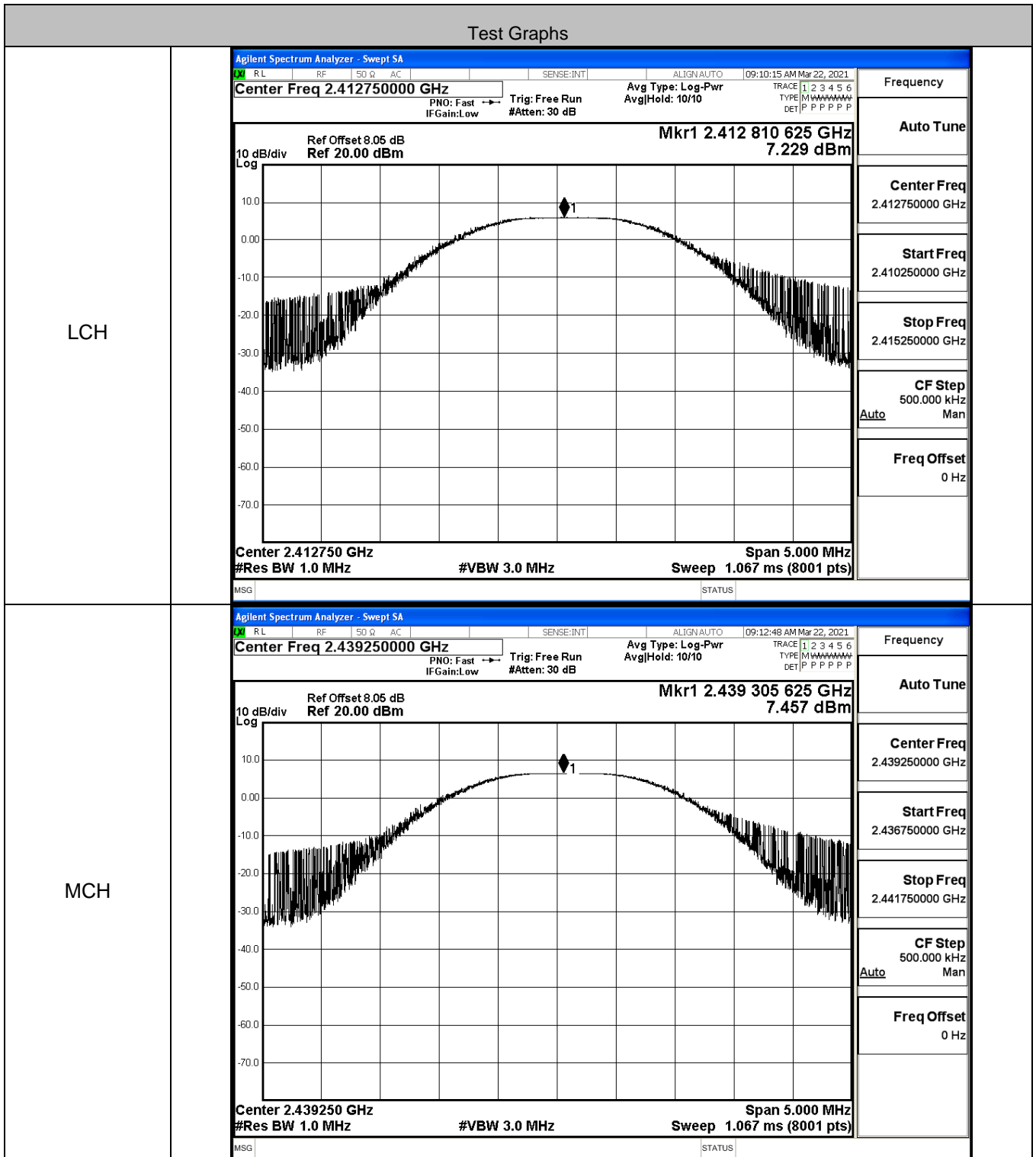
Test Mode	Test Channel	Ant	Duty Cycle[%]	Verdict
GFSK	2439.25	Ant1	100	PASS



A.2 Maximum Conducted Peak Output Power

Mode	Channel	Conduct Peak Power[dBm]	Limit [dBm]	Verdict
GFSK	LCH	7.229	30	PASS
GFSK	MCH	7.457	30	PASS
GFSK	HCH	8.091	30	PASS

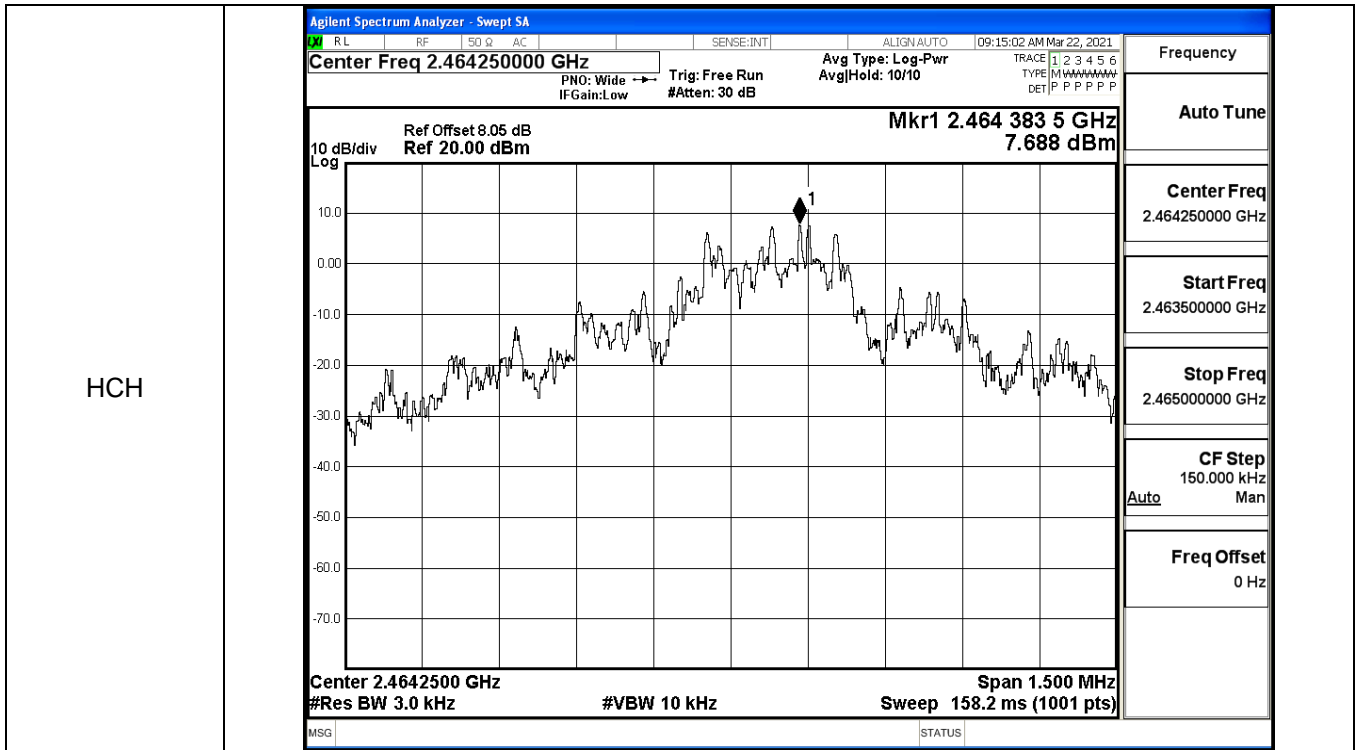
Test Graphs



A.3 Maximum Power Spectral Density

Mode	Channel	PSD [dBm/3KHz]	Limit [dBm/3KHz]	Verdict
GFSK	LCH	5.805	8	PASS
GFSK	MCH	7.265	8	PASS
GFSK	HCH	7.688	8	PASS

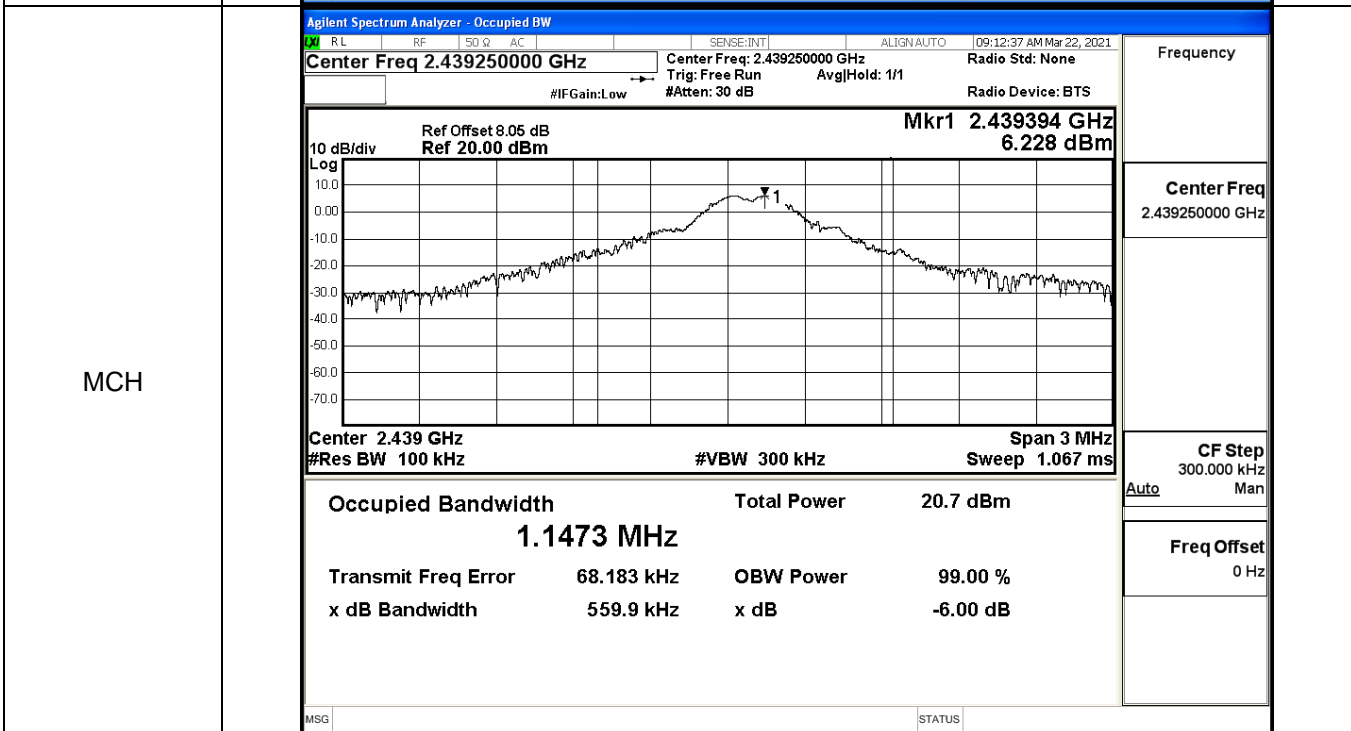
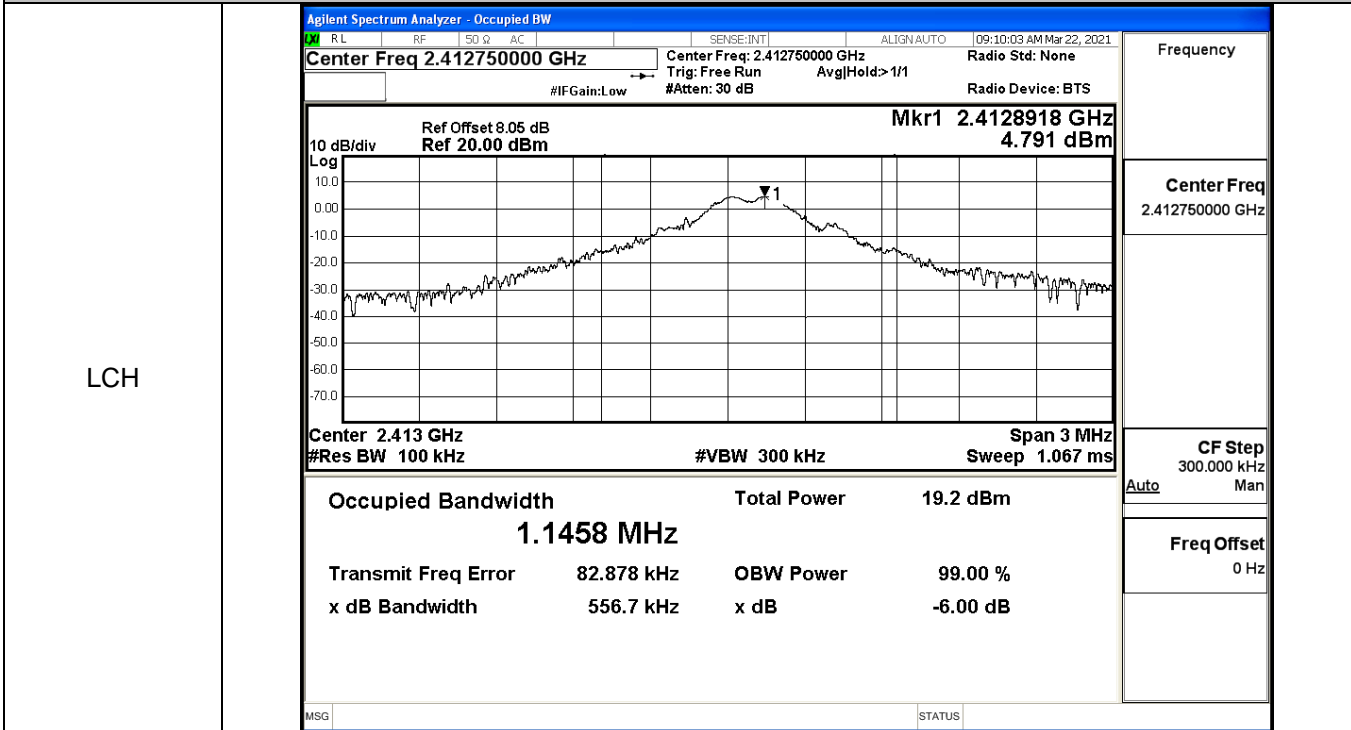
Test Graphs									
LCH	<div style="border: 1px solid black; padding: 5px;"> <p style="font-size: small; margin: 0;">Agilent Spectrum Analyzer - Swept SA</p> <p style="font-size: x-small; margin: 0;">RL RF 50 Ω AC SENSE:INT ALIGN:AUTO 09:10:28 AM Mar 22, 2021</p> <p style="font-size: small; margin: 0;">Center Freq 2.412750000 GHz Avg Type: Log-Pwr TRACE 1 2 3 4 5 6</p> <p style="font-size: x-small; margin: 0;">PNO: Wide → Trig: Free Run AvgHold: 10/10 TYPE M W M M M M M M M M</p> <p style="font-size: x-small; margin: 0;">IFGain:Low #Atten: 30 dB DET P P P P P P P P</p> <div style="display: flex; justify-content: space-between; font-size: small;"> Ref Offset 8.05 dB Mkr1 2.412 906 0 GHz </div> <div style="display: flex; justify-content: space-between; font-size: small;"> Ref 20.00 dBm 5.805 dBm </div> <div style="display: flex; justify-content: space-between; font-size: small; margin-top: 5px;"> Center 2.4127500 GHz Span 1.500 MHz </div> <div style="display: flex; justify-content: space-between; font-size: x-small; margin-top: 0;"> #Res BW 3.0 kHz #VBW 10 kHz Sweep 158.2 ms (1001 pts) </div> <p style="font-size: x-small; margin-top: 5px;">MSG STATUS</p> </div> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr><td>Frequency</td></tr> <tr><td>Auto Tune</td></tr> <tr><td>Center Freq 2.412750000 GHz</td></tr> <tr><td>Start Freq 2.412000000 GHz</td></tr> <tr><td>Stop Freq 2.413500000 GHz</td></tr> <tr><td>CF Step 150.000 kHz</td></tr> <tr><td>Auto Man</td></tr> <tr><td>Freq Offset 0 Hz</td></tr> </table>	Frequency	Auto Tune	Center Freq 2.412750000 GHz	Start Freq 2.412000000 GHz	Stop Freq 2.413500000 GHz	CF Step 150.000 kHz	Auto Man	Freq Offset 0 Hz
Frequency									
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Start Freq 2.412000000 GHz									
Stop Freq 2.413500000 GHz									
CF Step 150.000 kHz									
Auto Man									
Freq Offset 0 Hz									
MCH	<div style="border: 1px solid black; padding: 5px;"> <p style="font-size: small; margin: 0;">Agilent Spectrum Analyzer - Swept SA</p> <p style="font-size: x-small; margin: 0;">RL RF 50 Ω AC SENSE:INT ALIGN:AUTO 09:13:01 AM Mar 22, 2021</p> <p style="font-size: small; margin: 0;">Center Freq 2.439250000 GHz Avg Type: Log-Pwr TRACE 1 2 3 4 5 6</p> <p style="font-size: x-small; margin: 0;">PNO: Wide → Trig: Free Run AvgHold: 10/10 TYPE M W M M M M M M M M</p> <p style="font-size: x-small; margin: 0;">IFGain:Low #Atten: 30 dB DET P P P P P P P P</p> <div style="display: flex; justify-content: space-between; font-size: small;"> Ref Offset 8.05 dB Mkr1 2.439 404 5 GHz </div> <div style="display: flex; justify-content: space-between; font-size: small;"> Ref 20.00 dBm 7.265 dBm </div> <div style="display: flex; justify-content: space-between; font-size: small; margin-top: 5px;"> Center 2.4392500 GHz Span 1.500 MHz </div> <div style="display: flex; justify-content: space-between; font-size: x-small; margin-top: 0;"> #Res BW 3.0 kHz #VBW 10 kHz Sweep 158.2 ms (1001 pts) </div> <p style="font-size: x-small; margin-top: 5px;">MSG STATUS</p> </div> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr><td>Frequency</td></tr> <tr><td>Auto Tune</td></tr> <tr><td>Center Freq 2.439250000 GHz</td></tr> <tr><td>Start Freq 2.438500000 GHz</td></tr> <tr><td>Stop Freq 2.440000000 GHz</td></tr> <tr><td>CF Step 150.000 kHz</td></tr> <tr><td>Auto Man</td></tr> <tr><td>Freq Offset 0 Hz</td></tr> </table>	Frequency	Auto Tune	Center Freq 2.439250000 GHz	Start Freq 2.438500000 GHz	Stop Freq 2.440000000 GHz	CF Step 150.000 kHz	Auto Man	Freq Offset 0 Hz
Frequency									
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Center Freq 2.439250000 GHz									
Start Freq 2.438500000 GHz									
Stop Freq 2.440000000 GHz									
CF Step 150.000 kHz									
Auto Man									
Freq Offset 0 Hz									



A.4 6dB Bandwidth

Mode	Channel	6dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.5567	≥0.5	PASS
GFSK	MCH	0.5599	≥0.5	PASS
GFSK	HCH	0.5720	≥0.5	PASS

Test Graphs



HCH

Agilent Spectrum Analyzer - Occupied BW

<input checked="" type="checkbox"/> RL	<input type="checkbox"/> RF	<input type="checkbox"/> 50 Ω	<input type="checkbox"/> AC		SENSE:INT	ALIGN:AUTO	09:14:38 AM Mar 22, 2021
Center Freq 2.464250000 GHz				Center Freq: 2.464250000 GHz		Radio Std: None	
				Trig: Free Run		Avg Hold> 1/1	
				#IFGain:Low		#Atten: 30 dB	
				Radio Device: BTS			

10 dB/div

Log

Ref Offset 8.05 dB

Ref 20.00 dBm

Mkr1 2.4643903 GHz

6.766 dBm

Center 2.464 GHz

Span 3 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 1.067 ms

Occupied Bandwidth	Total Power	21.2 dBm
1.1956 MHz		
Transmit Freq Error	66.821 kHz	OBW Power 99.00 %
x dB Bandwidth	572.0 kHz	x dB -6.00 dB

MSG

STATUS

Frequency

Center Freq

2.464250000 GHz

CF Step

300.000 kHz

Auto Man

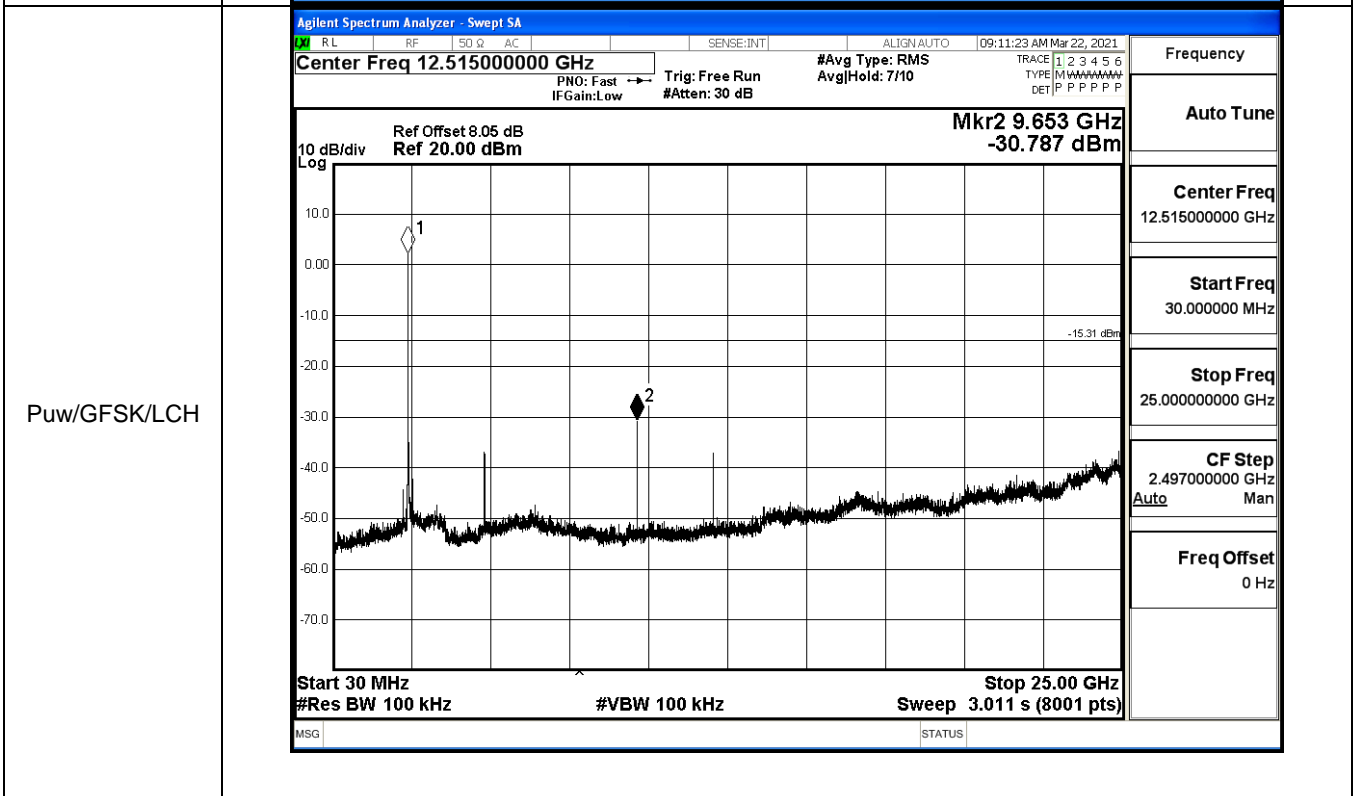
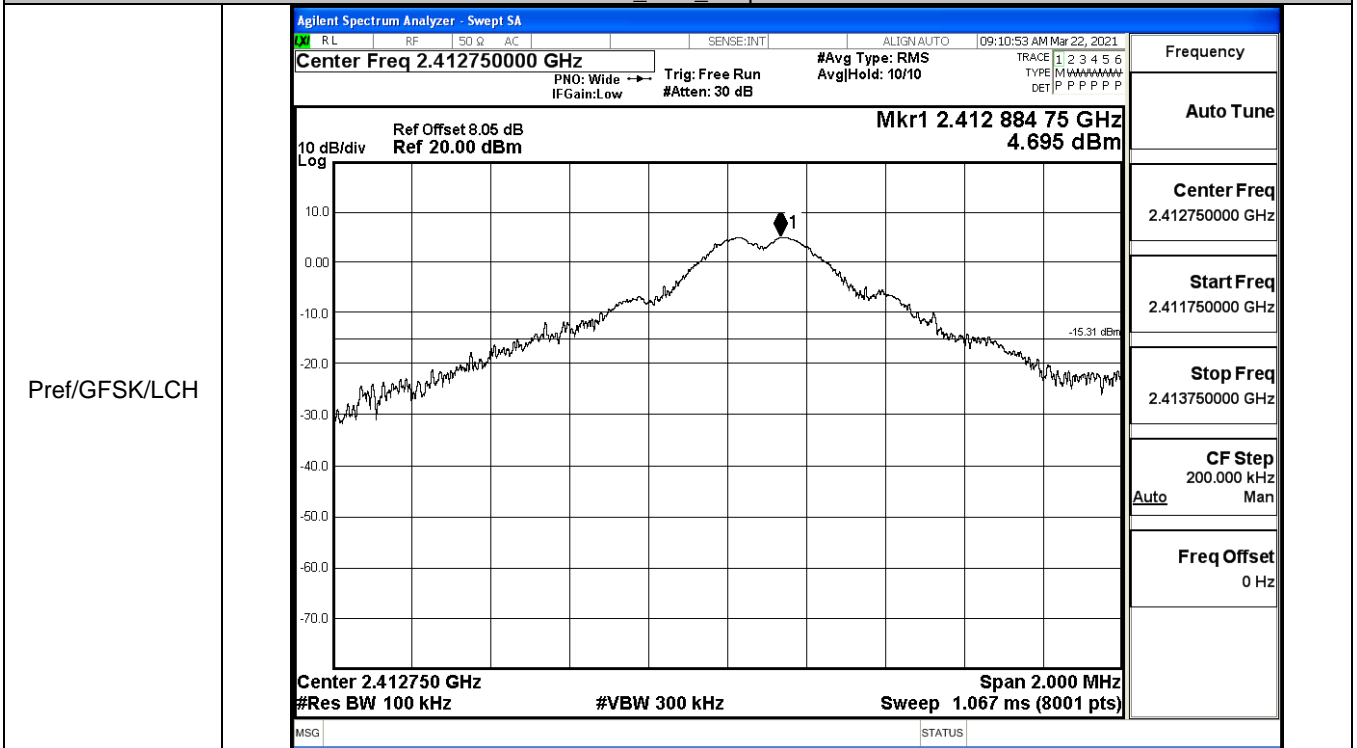
Freq Offset

0 Hz

A.5 RF Conducted Spurious Emissions

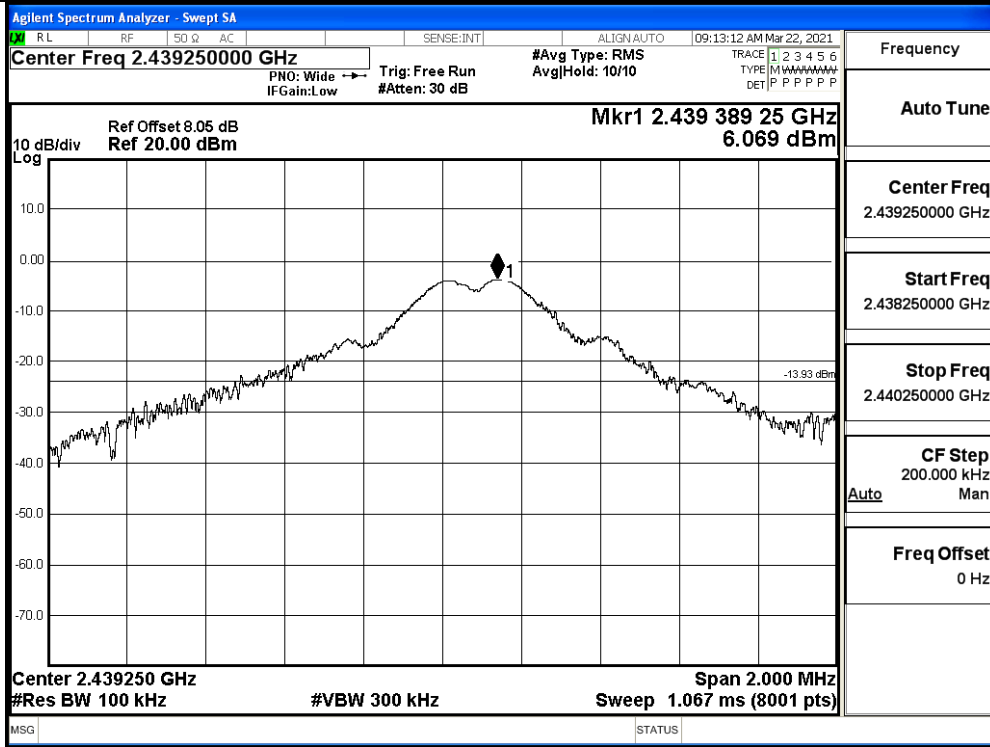
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.695	-30.787	-15.305	PASS
GFSK	MCH	6.069	-30.920	-13.931	PASS
GFSK	HCH	6.681	-32.077	-13.319	PASS

GFSK_LCH_Graphs

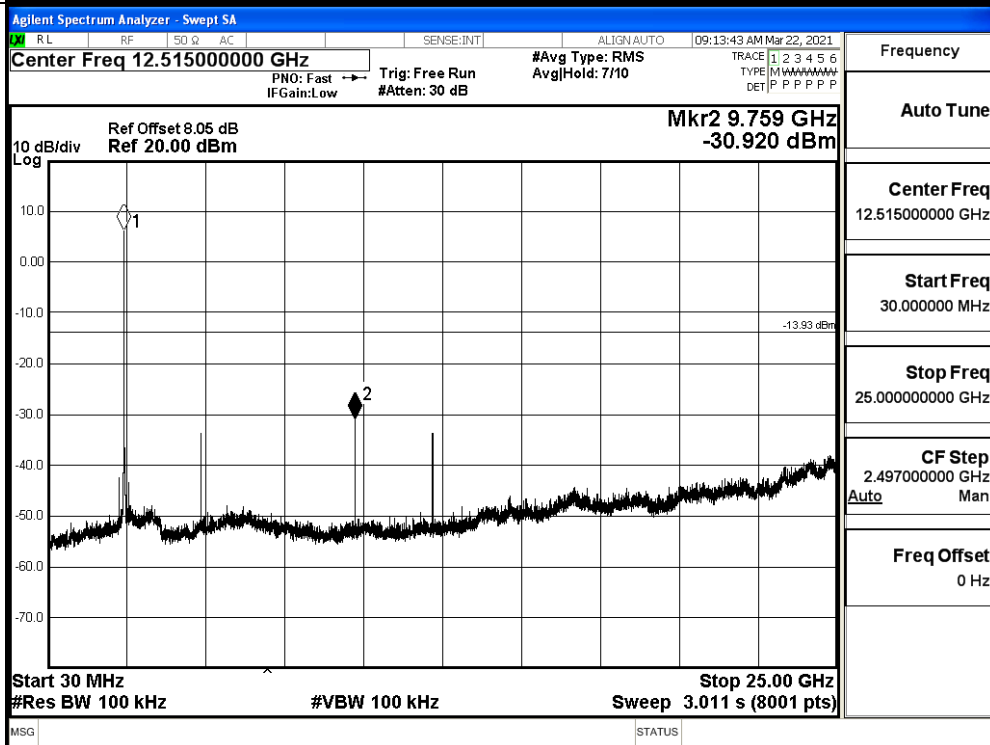


GFSK_MCH_Graphs

Pref/GFSK/MCH

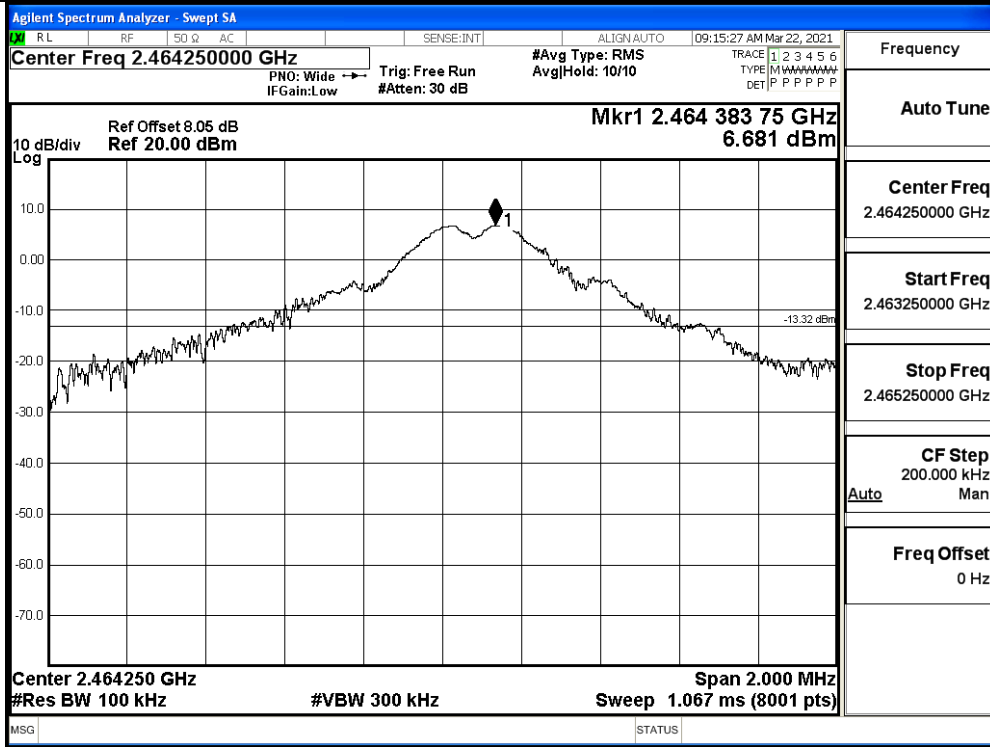


Puw/GFSK/MCH

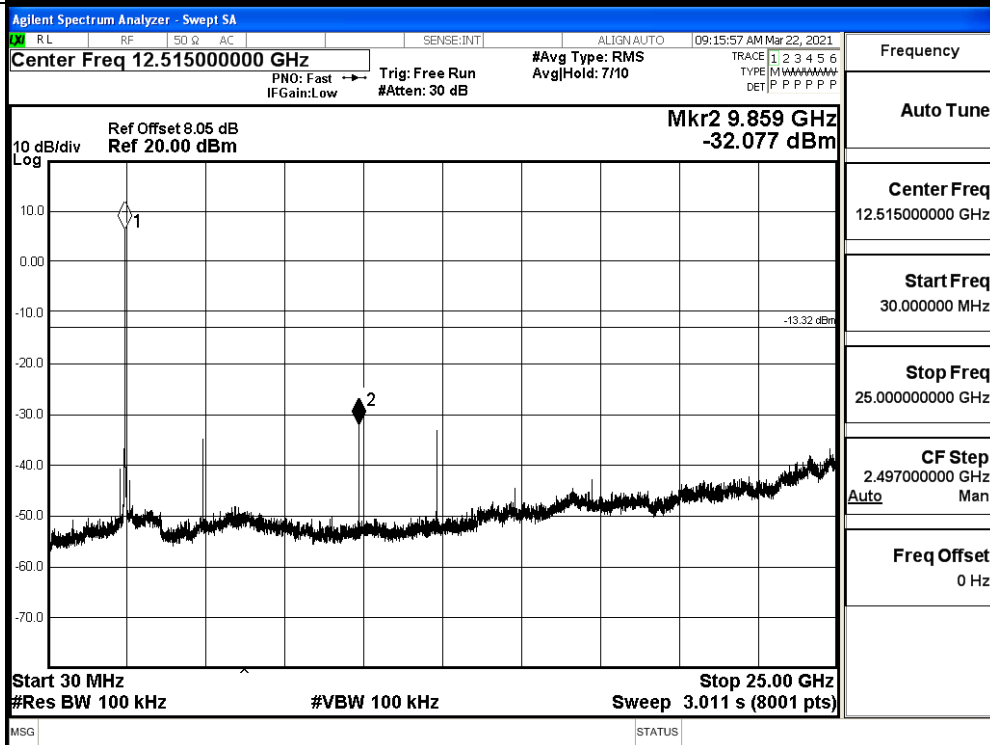


GFSK_HCH_Graphs

Pref/GFSK/HCH



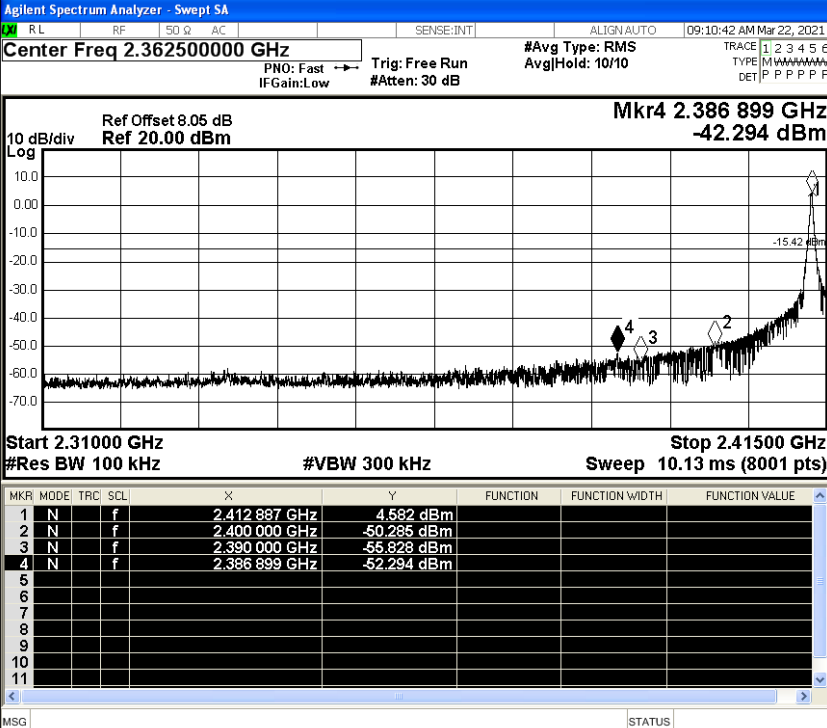
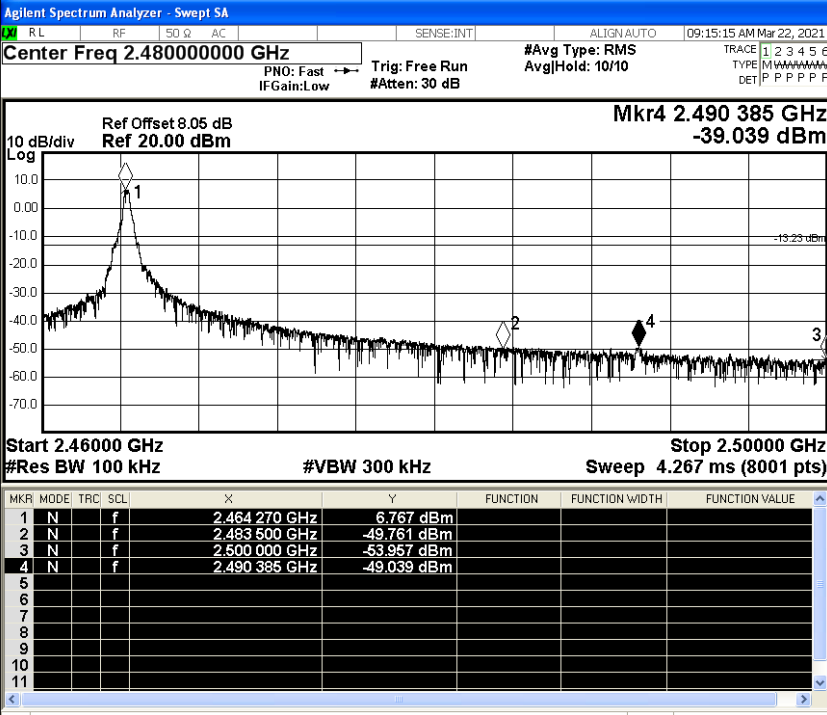
Puw/GFSK/HCH



A.6 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.582	-52.294	-15.42	PASS
GFSK	HCH	6.767	-49.039	-13.23	PASS

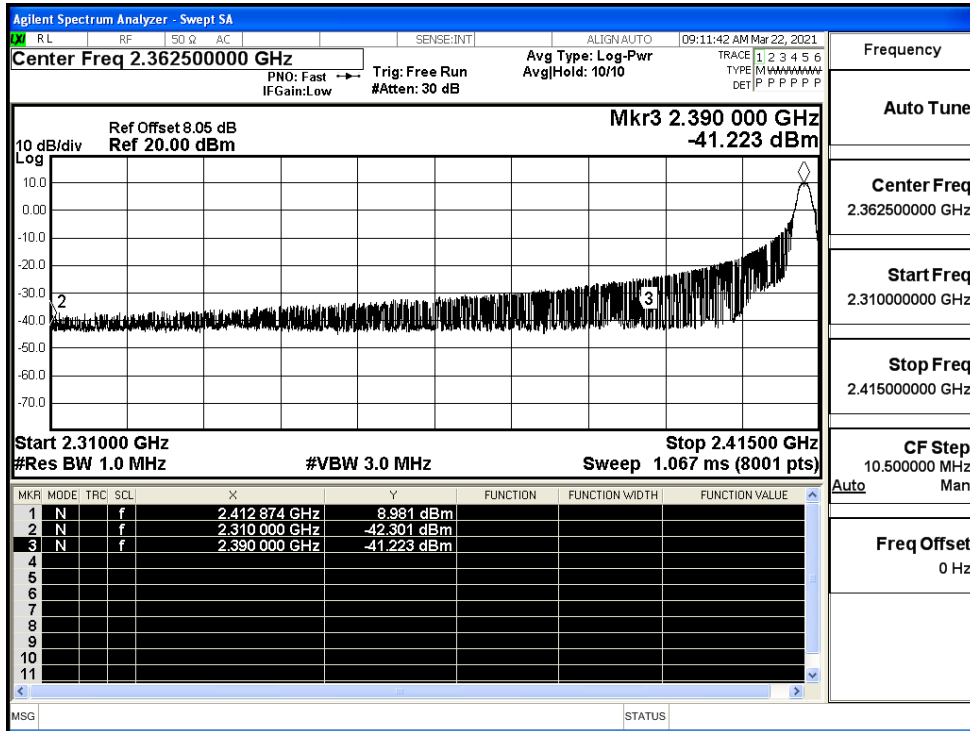
Test Graphs

LCH		<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.362500000 GHz</p> <p>Max Spurious Level -52.294 dBm</p> <p>Frequency: 2.362500000 GHz</p> <p>Auto Tune</p> <p>Start Freq: 2.310000000 GHz</p> <p>Stop Freq: 2.415000000 GHz</p> <p>CF Step: 10.500000 MHz</p> <p>Freq Offset: 0 Hz</p>
	HCH	

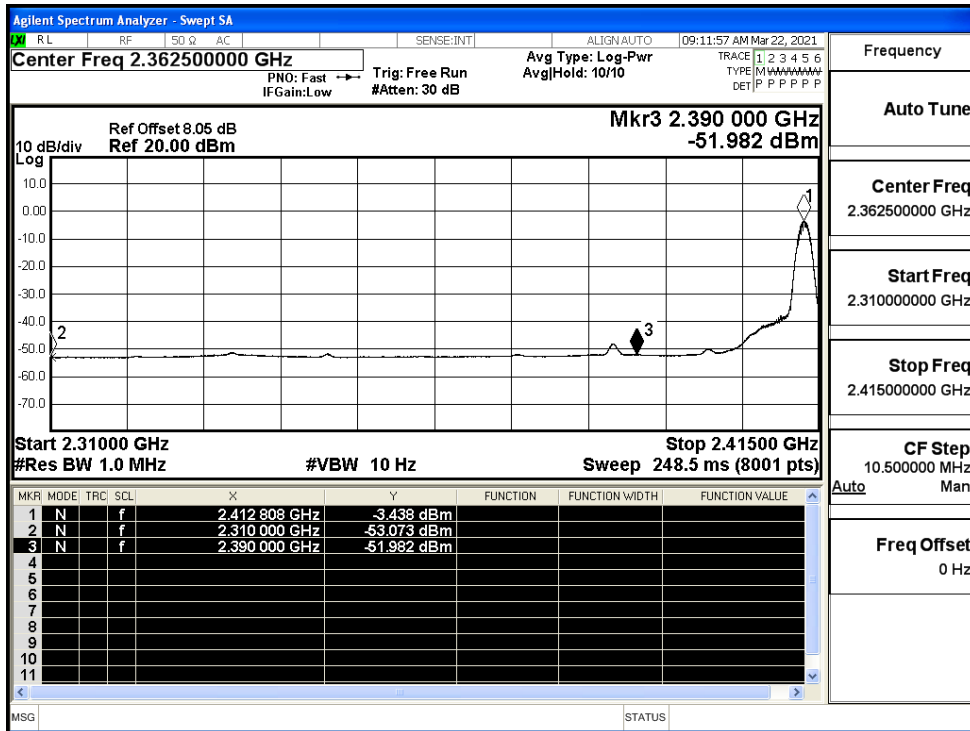
A.7 Restrict-band band-edge measurements

Test Mode	Test Channel	Ant	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdi
GFSK	2412.7 5	Ant1	2310.0	-42.30	2.0	0	54.96	PEAK	74	PASS
		Ant1	2310.0	-53.07	2.0	0	44.19	AV	54	PASS
		Ant1	2390.0	-41.22	2.0	0	56.04	PEAK	74	PASS
		Ant1	2390.0	-51.98	2.0	0	45.28	AV	54	PASS
	2464.2 5	Ant1	2483.5	-34.55	2.0	0	62.71	PEAK	74	PASS
		Ant1	2483.5	-51.76	2.0	0	45.50	AV	54	PASS
		Ant1	2500.0	-42.37	2.0	0	54.89	PEAK	74	PASS
		Ant1	2500.0	-51.96	2.0	0	45.30	AV	54	PASS

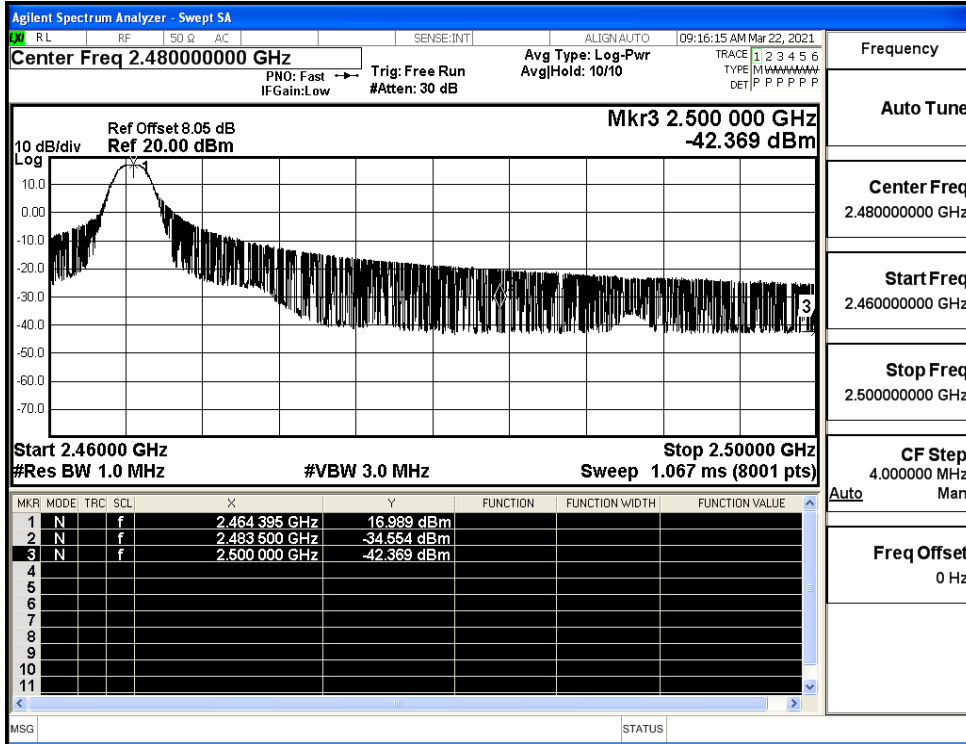
Restrict-band band-edge measurements_GFSK_2412.75_Ant1_PEAK



Restrict-band band-edge measurements_GFSK_2412.75_Ant1_AV



Restrict-band band-edge measurements_GFSK_2464.25_Ant1_PEAK



Restrict-band band-edge measurements_GFSK_2464.25_Ant1_AV

